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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,508	02/27/2004	Gordon James Johnston Bartley	090936.0546	7422

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EXAMINER

JOHNSON, EDWARD M

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 02/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/788,508

Applicant(s)

JOHNSTON BARTLEY ET AL.

Examiner

Edward M. Johnson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,9-15 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-15 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, 9-10, 12, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguro '401 in view of EP '968, Muradov '005, and the admitted prior art of Hornung et al.

Yamaguro discloses an apparatus for decreasing nitrogen oxides in a combustion device, wherein the exhaust gas is discharged as a result of continuous combustion with hydrogen gas so that the nitrogen oxides can be removed by a catalytic reduction reaction with the purifying catalyst. The amount of hydrogen gas supplied need only be enough to reduce the nitrogen oxide content in the exhaust gas.

The hydrogen gas is obtained by modification of fuel water vapor and by a partial combustion process (coI. 3, lines 20-39). Yamaguro et al. continues to disclose a partial oxidation unit (shift converter) operable to receive a portion of the fuel from

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the main fuel line to partially oxidize the fuel to produce a gas mixture containing hydrogen, and to deliver the gas mixture to the main exhaust line. Furthermore, a hydrogen selective catalytic reduction unit 5, located in-line on the main exhaust line, and downstream of the partial oxidation unit uses the hydrogen to continuously convert the NO_x emissions in the exhaust line to nitrogen (col. 5, lines 21-57), which would motivate an ordinary artisan to meter the hydrogen and maintain an optimum ratio of NO_x conversion.

However, Yamaguro et al. is silent in regards to the use of diesel fuel in the partial oxidation unit, whether the hydrogen selective catalytic reduction unit is operable during operating temperatures, ruthenium, and metering hydrogen to maintain the ratio of NO to NO₂.

EP 537,968 teaches a system for treating nitrogen oxide emission from a diesel engine including a hydrogen generator and a hydrogen selective catalytic reduction unit.

Muradov teaches using a variety of fuels, such as natural gas and diesel fuel in a hydrogen generator.

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Yamaguro et al., based on the teaching of EP'968 and Muradov, by treating nitrogen emissions from a diesel engine, since Muradov teaches

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using a variety of fuels, such as natural gas and diesel fuel in a hydrogen generator.

Hornung et al. discloses using ruthenium based reduction catalysts for selective catalytic reduction (applicant's admission and p. 8, line 31 - p. 9. line 5 of the instant specification). Since the catalysts disclosed by Hornung et al. are similar it would have been obvious to expect the catalysts to possess the same property as that of the instant claim, wherein the catalysts are operable at the same operating temperature thereof.

With respect to claims 9 and 18, Yamaguro et al. discloses a shift converter (64) downstream of the partial oxidation unit (63).

3. Claims 2, 6, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguro '401 in view of EP '968, Muradov '005, and the admitted prior art of Hornung et al., as applied above, and further in view of Manohar '501.

Applicant claims with respect to claims 2, 6, 11 and 15, wherein the partial oxidation unit is comprised of a non-stoichiometric burner. The teachings of Yamaguro et al. in view of EP 637,968, Muradov (US Patent 6,653,005) and the admitted of prior art Hornung et al. have been discussed with respect to claims 1, 3, 7, 9, 10, 12, 16 and 18, but the reference does not

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teach wherein the partial oxidation unit is comprised of a non-stoichiometric burner.

However, Manohar et al. teaches a burner system having a catalyst body that supports a partial oxidation catalyst operative to catalyze the fuel in the primary air/fuel mixture to intermediate combustion species, such as hydrogen, thereby reducing emissions such as nitrogen oxides (see abstract).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Yamaguro et al., EP 637,968, Muradov (US Patent 6,653,005) and the admitted of prior art Hornung et al., by using a non-stoichiometric burner as the partial oxidation unit in a process for reducing nitrogen oxides using hydrogen, because Manohar et al. teaches a process for reducing nitrogen oxides using hydrogen by partial oxidation, wherein the partial oxidation unit is comprised of a burner. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art would have expected a process for reducing nitrogen oxides using hydrogen wherein the process is conducted by partial oxidation as taught by Manohar et al., to be similarly useful and applicable to a process for the partial oxidation catalytic operation for the reduction of nitrogen oxides in gas emissions.

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4. Claims 4-5 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguro '401 in view of EP '968, Muradov '005, and the admitted prior art of Hornung et al. as applied to claim 1, 3, and 12 above, and further in view of Yokota '124.

Applicant claims with respect to claims 4, 5, 13, and 14, wherein the partial oxidation catalyst may be a nickel-based catalyst or a rhodium-based catalyst. The apparatus of Yamaguro et al is silent as to the specific catalyst for the partial oxidation unit.

However, Yokota et al teaches providing a partial oxidation unit including catalyst, such as nickel, rhodium, etc. (col. 7, lines 12-17).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Yamaguro et al., based on the teachings of Yokota et al., wherein the partial oxidation catalyst may be a nickel-based catalyst or a rhodium-based catalyst, because Yokota et al teaches providing a partial oxidation unit including catalyst, such as nickel and rhodium. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art would have expected a partial oxidation process as taught by Yokota et

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al., to have been similarly useful and applicable to a process for partial oxidation as taught by Yamaguro et al.

Response to Arguments

5. Applicant's arguments filed 1/25/06 have been fully considered but they are not persuasive.

It is argued that Hornung is silent... ruthenium-based catalyst. This is not persuasive because Applicant appears to admit that ruthenium is disclosed and because Yamaguro discloses a hydrogen selective catalytic reduction unit 5, located in-line on the main exhaust line, and downstream of the partial oxidation unit uses the hydrogen to continuously convert the NOx emissions in the exhaust line to nitrogen (col. 5, lines 21-57), which would motivate an ordinary artisan to meter the hydrogen and maintain an optimum ratio of NOx conversion.

Conclusion

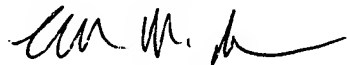
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward M. Johnson whose telephone number is 571-272-1352. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on 571-272-1358. The fax phone number for the

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organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Edward M. Johnson
Primary Examiner
Art Unit 1754

EMJ